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# INSTITUTIONAL MARKET POTENTIAL

# for OILSEED PROTEINS

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# THE INSTITUTIONAL MARKET POTENTIAL FOR OILSEED PROTEINS

By Constance L. Brine [1]

## HIGHLIGHTS

Between 1930 and 1956, the production of soybeans in the United States rose from about 14 million to over 400 million bushels a year. With the production area in the Middle West expanding both north and south, and with the substitution of soybeans for crops under acreage control, further increases can be expected.

In anticipation of such increases, a study was undertaken to try to locate new markets for soybean products. The heretofore unexplored market provided by residential-type institutions appeared to have potentials for the use of protein-seed meals in food,as the population of these institutions had been rising steadily. In many instances, their already conservative food money allowances had not kept pace, and this fact had intensified the problem of providing nutritionally adequate diets. With protein foods usually taking a large share of the food dollar, it seemed that administrators of these institutions might be interested in supplementing diets with a less expensive source of this nutrient, such as that provided by soybean flour or meal. This would leave a larger share of the money allowance for purchase of foods supplying other nutrients that sometimes are low, such as vitamin C and calcium.

To appraise the need for and the practical value of the use of soybean products, a study was made of the quantity, cost, and nutritive content of food used during a 28-day period in the winter and a similar period in the summer of 1952 in 16 public and private institutions in the northeastern and southeastern parts of the United States. Among these were homes for the aged, children's homes, and mental and penal institutions. Similar data were collected on a "pilot" basis in 3 general hospitals in the Northeast during the winter of 1953.

After some allowance was made for losses of food during preparation and serving of meals and for losses of vitamins during cooking, an analysis of the data showed that, in several of these institutions, the quantities of one or more nutrients fell below the dietary allowances recommended by the National Research Council. These recommended allowances are for "levels of nutrient intake normally desirable as goals and objectives."

In 9 institutions during the winter period and in 11 during the summer, 1 or more nutrients were below these allowances, with the greatest deviations noted in mental institutions and homes for the aged. During both the periods, at least 5 institutions were low in calcium, niacin, iron, and food energy. On the other hand, though many foods that furnish protein are among the most expensive kinds, this nutrient was low in only 3 institutions in the winter and 2 in the summer.

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[1] Food Nutritionist, Arthur D. Little, Inc., Cambridge, Mass.

In considering the findings, it must be kept in mind also that these are averages, and hence do not show differences that may exist in nutrients received by individual residents. If, for example, practices observed in one institution prevailed in others, even to a lesser degree, the nutrient intake of some individuals could be adversely affected. From this one observation, it was estimated that, after considering age and activity needs, the nutrient intake of some individuals might deviate as much as 25 percent from the average. This was caused primarily by differences in the kind and quantities of food served inmates as compared to that served to the staff.

Meat and cereal products, which are the types of food quite easily supplemented with soybean meal or flour, took from 27 to 54 cents out of the food dollar. Ten of the institutions spent at least 40 percent of their money for meat and cereal foods during the winter period.

In institutions where diets are adequate in protein but below the suggest allowances for some other nutrients, the amount spent for foods high in protein could be reduced by using soybean products. For example, if in one of these institutions, meat and cereal products were supplemented with soybean meal or flour to the 6-percent level, the same quantity of protein which cost 25.0 cents per person per day could be obtained for 21.6 cents. 2/ Though this may seem a rather small saving on a per person basis, in a mental institution with a population of 5,000 (and many have larger populations), it would amount to about $62,000 per year. This amount could then be used for purchases of additional foods furnishing other nutrients sometimes in short supply, such as citrus fruit to increase vitamin C, and milk products for more calcium.

New York mental institutions have done considerable experimental work in supplementing meat and cereal foods with oilseed products, and currently are using about 0.03 pound per person per day. If all types of institutions, excluding general hospitals, used soy products to this same extent, a market potential of about 77 million pounds a year could be expected. Mental institutions and homes for the aged might be the most fertile field for initially promoting the use of soybean products. These institutions alone could represent a market potential of 8 million pounds per year.

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2/ The term "6-percent level" is defined as the proportion that soy flour is of the total food weight being supplemented. One pound of defatted soy flour is produced from about 1.79 pounds of soybeans.

Even though the foregoing points to a fair-sized market, observations made during this study indicate that an intense and specially "tailored" technical sales effort might be required to develop the institutional market. It has been known for some time that soybean meals are considerably less expensive on the basis of protein content than competing foods, yet this fact has not created a significant demand. Hence, it appears that the program would have to be a highly convincing one to stimulate enough action to produce a worthwhile market.

There may be a slight increase in sales of protein seed meals as new uses for these products are developed, but the greatest return for the effort spent may well come from interesting food industries in incorporating soy products in more of the foods purchased by institutions. Formulas for breads and rolls, soup mixes, and many lunch meats can be readily adapted to include these products.

## BACKGROUND

Among the sources of protein for human consumption, soybean meal, cottonseed meal, and nonfat milk solids are abundantly produced in the United States. Proteins from foods of animal origin are generally considered to be good sources of amino acids. Soybean protein is not so good a source in this respect, but it is considerably less expensive. However, with soy products as only a supplementary source of protein in the diet, this factor is of minor importance. Because of its abundance and relatively low price, soybean flour offers a valuable source of protein for supplementing low-cost diets.

The principal seeds processed for meal are soybeans, cottonseed, corn, and peanuts. By far the major quantity of these meals is used for animal feed; only a small percentage goes into the food or other industries. Among the oilseeds, only soybeans and cottonseed are being made into flour and grits, with soy flour production greatly exceeding that of cottonseed flour. Sesame and sunflower seed flours would offer good alternatives, but production of such seeds in the United States is extremely small.

Production of soybeans has increased rapidly over a relatively short time. As recently as 1930, the yearly production amounted to only 13.9 million bushels. In 1956, it was more than 400 million bushels. Though soybeans have been grown chiefly in the Middle West, development of new varieties has extended this growing area both north and south. In some sections of the South, 2 crops may be grown yearly as compared to 1 of cotton. Moreover, the substitution of soybeans for crops under acreage control suggests the possibility of still further increases in production. This is already evident in estimates for 1956, which are about one-fourth higher than the previous record crop of 1955. [3]

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[3] Crop Production, U. S. Crop Summary as of Sept. 1, 1956, USDA, AMS.

The quantity of soybean meal processed into flour is still relatively small. Even though soybean meal and flour have been known for their high protein content and lower cost in comparison with many other foods with similar protein values, their use in food has been negligible. With the anticipated increases in supplies, potential markets needed to be explored.

One such market appeared to be in institutions where people are in residence for long periods. During recent years, such institutions have increased considerably in population. Between 1940 and 1950, there was a 21-percent rise in the population of homes for the aged alone, and other types of institutions showed smaller, but still important, increases. By 1950, 1 out of every 100 persons in the United States was living in some type of public or private institution. 4/

Although the number of persons living in institutions has been steadily rising, food money allowances have not always kept pace with these increases or with increases in the cost of food. In many instances, this fact has intensified the problem of providing nutritionally adequate diets. Since most of the public and private institutions provide long-time residence for a large share of their population, the need for supplying adequate diets is apparent. With protein foods usually taking the largest share of the food dollar, it seemed that institutions might be interested in supplementing their diets with less expensive sources of this nutrient as, for example, soybean meal or flour. This would leave more of the money allowance for purchase of foods supplying other nutrients sometimes low in institutional diets, such as vitamin C and calcium.

## OBJECTIVES

The primary purpose of this research was to appraise the market potential for oilseed proteins in public and private institutions. To provide a basis for such an appraisal, the study was designed to determine: The nutrient content of food served in selected institutions; the economic and nutritional importance of protein foods in these diets; the economic effect of supplementing institutional food with oilseed proteins; and the merchandising program needed to develop this market.

A second phase of the study was to evaluate present patterns of use of vegetable proteins in food products and to appraise potential use of vegetable proteins in industrial food channels.

## METHOD

Studies were made of the food used in 16 non-Federal institutions--penal, charitable, and mental--in the northeastern and southeastern sections of the

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4/ Does not include educational, religious, or military institutions.

country, in or near two similar metropolitan areas with populations between 500,000 and 750,000 each. Insofar as possible, institutions were paired in the 2 regions on the basis of type, size, and distance from the metropolitan center.

Institutions in which the survey was conducted included 4 homes for children, 2 in each region; 5 homes for the aged, 2 in the Northeast and 3 in the Southeast; 3 mental institutions, 2 in the Northeast and 1 in the Southeast; and 4 penal institutions, 2 in each region. All of these provided long-term care and had little change in population.

Information was collected from 3 general hospitals in the Northeast, with capacities of 150 to 200 beds, that provided short-term care for acutely ill patients.

The 16-institution study covered a 28-day period in the winter of 1952 and a similar period in the summer of 1952. These were considered the best periods to indicate seasonal differences in food use, if differences existed.

In 1 of the 3 general hospitals, records were obtained for a 7-day period; in the other 2, for only 1 day.

Data were collected on the quantity of food in inventory at the beginning and end of the period and on issues of food to the kitchens during the survey period. Food used was computed on an "as purchased" basis by adding quantities of food issued to those in the beginning inventory and then subtracting from this total the quantities in inventory at the end of the period.

The nutrient content of food issued, per person per day, in terms of food energy and 8 nutrients, was computed, using composition values given in table 2, Composition of Foods, Raw, Processed, and Prepared, USDA Agriculture Handbook No. 8. Then, to estimate nutrient content of food eaten, the total for each nutrient was adjusted for some plate and preparation losses between issue and consumption. Factors used for this adjustment were based on data obtained in an intensive study of food losses carried on in 4 of these same institutions. 5/

To take account of some of the losses of thiamine, riboflavin, niacin, and ascorbic acid during cooking, factors compiled for use in studies of family food consumption were used. 6/

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5/ Brine, C. L. and Tate, E. B. "Effect of Food Losses on Nutrient Content of Diets in Four Institutions." Journal of the American Dietetics Assn. Vol. 32, No. 1. January 1956.

6/ "Nutritive Content of Homemakers' Meals, Four Cities, Winter, 1948." USDA, Agr. Inf. Bul. 112, 67 pp. 1954.

After these adjustments were made, the averages were compared with the National Research Council's recommended allowances, which had been weighted according to the sex, age, and activity of the residents. 7/

## FINDINGS

### Sixteen-Institution Study

Information collected in this survey indicated that, on the average, nutrient content of food eaten was below the National Research Council's recommended allowances for 1 or more of the nutrients studied in 9 of these institutions during the winter period and in 11 during the summer (table 1). If "borderline" cases (between 100 and 110 percent of the allowances) are included, 13 of the 16 institutions were below the suggested allowances in 1 or more nutrients during both the summer and winter periods. Minerals and vitamins were the nutrients most often low.

Nutrients were more often below the allowances in homes for the aged and in mental institutions than in the other types. Four of the 5 homes for the aged and 2 of the 3 mental institutions were below the suggested allowances in 5 or more nutrients. If this were the case generally throughout the country, it would be particularly significant in view of the large percentage of total institutional population consisting of aged persons and mental patients.

One children's home in the Northeast was below the National Research Council's recommended allowances in 6 nutrients during the summer period and 2 nutrients in the winter (table 1).

In addition, variation was observed in food eaten by different groups within the same institution--a greater variation than could be accounted for by age and level of activity. For example, observation in 1 institution showed that the quantity of food consumed by the staff, which represented 22 percent of the total population, was at least twice as much per person for many food items and three times as much for others as that eaten by the inmates. Although this situation was not observed to as great a degree in other instances, it does point to the fact that averages given for an institution do not present a complete picture and can be misleading if applied to an individual inmate.

Though many foods supplying protein are of the more expensive kinds, only 3 of the institutions studied were lower than the National Research Council's suggested allowances in protein (tables 2 and 3). 8/ On the other hand, during the summer period 6 or more institutions were below the suggested

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7/ National Research Council, Food and Nutrition Board, "Recommended Dietary Allowances." National Research Council. Reprint Circ. Series No. 129. 21 pp. Revised 1948.

8/ Allowances weighted according to age, sex, and activity needs of inmates.

allowances for ascorbic acid, niacin, thiamine, iron, calcium, and food energy. During the winter period, 6 or more of these institutions served meals that were below the allowances in food energy, iron, and niacin. 9/

Table 1.--Number of nutrients below National Research Council's recommended dietary allowances 1/ and number of nutrients on the borderline based on food eaten in 16 institutions, 28-day period, winter and summer, 1952

| Type of institution and location | Nutrients below NRC | | Nutrient borderline 2/ | |
|---|---|---|---|---|
| | Winter | Summer | Winter | Summer |
| | Number | Number | Number | Number |
| Homes for the aged | | | | |
| Northeast | 2 | 5 | 2 | 1 |
| Northeast | 6 | 6 | 3 | 1 |
| Southeast | 0 | 3 | 1 | 2 |
| Southeast | 7 | 7 | 1 | 2 |
| Southeast | 8 | 8 | 0 | 0 |
| Mental institutions | | | | |
| Northeast | 0 | 5 | 2 | 2 |
| Northeast | 0 | 0 | 2 | 2 |
| Southeast | 6 | 5 | 1 | 3 |
| Children's homes | | | | |
| Northeast | 2 | 6 | 1 | 1 |
| Northeast | 0 | 0 | 0 | 0 |
| Southeast | 4 | 2 | 2 | 2 |
| Southeast | 2 | 3 | 1 | 1 |
| Penal institutions | | | | |
| Northeast | 0 | 0 | 0 | 0 |
| Northeast | 0 | 0 | 0 | 0 |
| Southeast | 1 | 0 | 0 | 1 |
| Southeast | 0 | 1 | 2 | 0 |

1/ National Research Council's recommended allowances weighted by the sex, age, and activity levels of inmates in residence in the respective institution during the survey period.

2/ Borderline cases include those from 100 to 110 percent of National Research Council's weighted recommended allowances.

## Money Value of Protein From Various Food Sources

In analyzing data from the 16 institutions, it was found that animal foods contributed from 56 to 71 percent of the total protein (table 4). Primarily because of a higher consumption of milk products, children's homes received the largest proportion of their protein from animal foods. On the other hand, the mental institutions obtained the smallest proportion of protein from animal sources.

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9/ Additional information relative to food issues, food eaten, and food money value is presented in tables 6 through 13, appendix B.

Table 2.--Nutritive content of food eaten[1] per person per day as a percentage of National Research Council's recommended allowances after weighting[2], 28-day period, 16 selected institutions, winter, 1952

| Type of institution and location | Food energy | Protein | Calcium | Iron | Vitamin A value | Thiamine | Ribo-flavin | Niacin | Ascorbic acid |
|---|---|---|---|---|---|---|---|---|---|
| | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent |
| Homes for the aged.... | | | | | | | | | |
| Northeast........... | 102 | 105 | 119 | 95 | 123 | 113 | 121 | 93 | 125 |
| Northeast........... | 91 | 102 | 68 | 73 | 102 | 65 | 80 | 99 | 104 |
| Southeast........... | 111 | 135 | 146 | 137 | 201 | 132 | 147 | 124 | 108 |
| Southeast........... | 86 | 86 | 95 | 75 | 128 | 91 | 102 | 76 | 89 |
| Southeast........... | 79 | 89 | 79 | 89 | 186 | 80 | 83 | 82 | 83 |
| Mental institutions... | | | | | | | | | |
| Northeast........... | 113 | 127 | 111 | 105 | 226 | 122 | 124 | 102 | 139 |
| Northeast........... | 107 | 141 | 109 | 153 | 210 | 134 | 129 | 123 | 164 |
| Southeast........... | 81 | 94 | 75 | 91 | 116 | 101 | 84 | 82 | 145 |
| Children's homes...... | | | | | | | | | |
| Northeast........... | 99 | 120 | 90 | 116 | 229 | 110 | 136 | 133 | 121 |
| Northeast........... | 127 | 162 | 140 | 138 | 224 | 130 | 173 | 146 | 131 |
| Southeast........... | 87 | 105 | 104 | 90 | 211 | 94 | 138 | 81 | 129 |
| Southeast........... | 123 | 129 | 149 | 86 | 126 | 120 | 146 | 109 | 84 |
| Penal institutions.... | | | | | | | | | |
| Northeast........... | 113 | 138 | 135 | 144 | 183 | 136 | 147 | 128 | 149 |
| Northeast........... | 133 | 162 | 158 | 163 | 310 | 113 | 164 | 126 | 121 |
| Southeast........... | 99 | 130 | 126 | 135 | 163 | 133 | 154 | 118 | 131 |
| Southeast........... | 120 | 131 | 104 | 116 | 187 | 106 | 132 | 139 | 117 |

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[1] Recommended Dietary Allowances, National Research Council Reprint and Circular Series No. 129, Revised 1948.

[2] All nutrients corrected for food losses and additional correction of thiamine, riboflavin, niacin, and ascorbic acid for cooking losses.

Table 3.--Nutritive content of food eaten per person per day as percentage of National Research Council's recommended dietary allowances after weighting[1], 28-day period, 16 selected institutions, summer, 1952

| Type of institution and location | Food energy | Protein | Calcium | Iron | Vitamin A value | Thiamine | Ribo-flavin | Niacin | Ascorbic acid |
|---|---|---|---|---|---|---|---|---|---|
| | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent |
| Homes for the aged.... | | | | | | | | | |
| Northeast........... | 95 | 101 | 113 | 76 | 129 | 93 | 118 | 84 | 90 |
| Northeast........... | 87 | 112 | 98 | 72 | 111 | 70 | 104 | 99 | 99 |
| Southeast........... | 120 | 129 | 142 | 98 | 82 | 106 | 122 | 101 | 65 |
| Southeast........... | 80 | 90 | 98 | 78 | 100 | 79 | 103 | 78 | 78 |
| Southeast........... | 89 | 86 | 64 | 84 | 119 | 80 | 73 | 88 | 50 |
| Mental institutions... | | | | | | | | | |
| Northeast........... | 105 | 121 | 90 | 92 | 113 | 93 | 106 | 93 | 73 |
| Northeast........... | 108 | 136 | 103 | 156 | 112 | 121 | 113 | 121 | 119 |
| Southeast........... | 93 | 104 | 90 | 101 | 177 | 99 | 104 | 90 | 82 |
| Children's homes...... | | | | | | | | | |
| Northeast........... | 82 | 100 | 90 | 86 | 147 | 79 | 112 | 78 | 93 |
| Northeast........... | 115 | 145 | 133 | 121 | 264 | 114 | 164 | 131 | 131 |
| Southeast........... | 90 | 113 | 121 | 100 | 195 | 104 | 138 | 98 | 156 |
| Southeast........... | 121 | 129 | 139 | 85 | 94 | 128 | 142 | 108 | 88 |
| Penal institutions.... | | | | | | | | | |
| Northeast........... | 123 | 146 | 157 | 133 | 220 | 123 | 174 | 121 | 149 |
| Northeast........... | 141 | 174 | 189 | 162 | 173 | 112 | 179 | 120 | 123 |
| Southeast........... | 102 | 134 | 128 | 143 | 309 | 125 | 164 | 112 | 142 |
| Southeast........... | 144 | 152 | 138 | 127 | 192 | 147 | 135 | 184 | 96 |

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[1] National Research Council's allowances weighted by the sex, age, and activity levels of inmates in residence during the survey period in the respective institution.

Table 4.--Average contribution of animal and vegetable foods to total protein content of food used

| Food groups | Homes for the aged | | Homes for children | | Mental institutions | | Penal institutions | |
|---|---|---|---|---|---|---|---|---|
| | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent |
| Total animal and vegetable foods | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Total animal foods | 62 | 64 | 71 | 70 | 56 | 56 | 63 | 64 |
| Milk, cream, ice cream, cheese | 26 | 29 | 35 | 38 | 21 | 19 | 27 | 29 |
| Meat, poultry, fish | 29 | 27 | 27 | 24 | 29 | 30 | 29 | 29 |
| Eggs | 6 | 8 | 9 | 6 | 5 | 5 | 5 | 5 |
| Fats and oils (animal) 1/ | 1 | 2 | 1 | 3 | 2 | 1 | 1 | 1 |
| Total vegetable foods | 38 | 36 | 29 | 30 | 44 | 44 | 37 | 36 |

1/ Includes bacon and salt pork.

Cereal foods contributed from 13 to 33 percent of the total protein--the largest amount from any vegetable source. In 2 mental institutions, however, cereal foods supplied more protein than any other kind of food including meat.

In appraising the relative cost of protein from the various food sources, particular emphasis was given to meat, poultry, and fish products and to cereal foods, as these can be most successfully supplemented with oilseed proteins. The costs of protein from these sources varied considerably among the institutions. The amount spent for meat, poultry, and fish products varied from 53 cents to $1.09 per 100 grams of protein; the amount spent for cereal products ranged from 14 to 60 cents per 100 grams. 10/ This wide variation in expenditures was due to several things. Important among these was the difference in unit price paid for the same food items. Smaller institutions often paid more because much of their food was purchased at retail outlets. Some of the larger institutions bought directly from wholesale establishments, while others purchased from the lowest bidder under contractual arrangements.

A second reason for the wide variation in expenditures was the difference from one institution to another in the relative quantities of the different foods purchased--for example, the proportion of stew meat to steaks.

Protein obtained from soybean meal would have been less expensive than that from either the meat or grain products used by these institutions. The price per pound of soy flour was slightly more than that for wheat flour, but cheaper as a source of protein. Low-fatted soy flour contains about 200 grams of protein per pound as compared with 48 grams per pound of white, all-purpose flour. Lean round steak, which is considerably more expensive than soy flour, provides about 80 grams of protein per pound.

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10/ One-hundred grams is equivalent to about 4 ounces.

Soy flour or grits could not be expected to replace a large amount of meat and cereals, but some supplementation would offer a means of reducing the total amount spent for these foods. To check on the practicability of doing this, a program of supplementation was started in 2 of 16 institutions that were low in several nutrients--a mental institution and a home for the aged. Only a small proportion of soy flour was used at first. This was gradually increased, but at no time during the trial period was it used in a ratio of more than 3 pounds of soy flour per 100 pounds of other food.

After a period of several weeks, a follow-up visit was made to determine the quantities of soy products that had been used and the effect on nutritive value and food cost. The ultimate nutritional and economic significance of this program could not be accurately appraised, as the institutions were still adjusting the quantity of soy products used, determining ways successfully to incorporate the soy products into various foods, and developing specifications for purchase of the products.

Soy flour was used to a 3-percent level in rolls, biscuits, corn bread, cakes, and a few special items, such as soup in the home for the aged and in all bread and rolls made in the central bakeshop of the mental institution.

In each of these institutions, the use of these small amounts of soy flour resulted in an increase in the nutrient content of the diet of approximately 3 percent protein, 4 percent thiamine, and 1 percent niacin. No objectionable differences in flavor or texture were noticed, and favorable comments regarding flavor were received. A color difference was noted by the baker in the large institution, but not by other staff members or inmates.

An estimate of the economic significance of what may be gained from supplementation is shown in the following illustration. In one mental institution during the summer period, 57.2 grams of protein were provided from meat and cereal foods at a cost of 25 cents per person per day. A supplementation program at the 6-percent level would provide the same quantity of protein at a cost of about 21.6 cents, or a saving of approximately 3.4 cents per person per day (table 5). This may seem small, but when projected to an institutional population of 5,000 persons, it would lower the cost of protein foods by $170 per day or by $62,000 annually. This would provide more leeway within the same total money allowance to purchase foods furnishing other nutrients in short supply.

## Hospital Survey

Information on food issues was obtained from three general hospitals in the Northeast. In contrast to the 16 institutions, the hospitals provided short-term care for acutely ill individuals.

The average protein intake of the patients was between 103 and 120 percent of the NRC recommended allowances for persons in normal health. A higher proportion of the protein was obtained from animal foods (68 to 81 percent) than was true for most of the 16 institutions.

Table 5.--Quantity of protein furnished from meat and flour products, cost per person per day, and estimated cost of providing similar quantities of protein by supplementing these foods with soy products at a 6-percent level

| Type of institution and location | Protein from meat | | | Protein from cereal products | | | Savings due to supplementation | |
|---|---|---|---|---|---|---|---|---|
| | | Cost | | | Cost | | | |
| | Amount | Of meat, poultry and fish | Of equivalent amount of protein, with supplementation of soy products at 6-percent level | Amount | Of cereal products | Of equivalent amount of protein, with supplementation of soy products at 6-percent level | Per person per day | 100 persons per month |
| | Grams | Cents | Cents | Grams | Cents | Cents | Cents | Dollars |
| Homes for the aged.... | | | | | | | | |
| Northeast.......... | 20.1 | 13.5 | 11.9 | 21.4 | 5.7 | 4.6 | 2.7 | 81 |
| Northeast.......... | 29.2 | 31.8 | 28.1 | 15.7 | 8.6 | 6.9 | 5.4 | 162 |
| Southeast.......... | 23.8 | 13.5 | 11.9 | 23.0 | 5.3 | 4.4 | 2.5 | 75 |
| Southeast.......... | 18.9 | 13.0 | 11.5 | 19.4 | 7.3 | 5.9 | 2.9 | 87 |
| Southeast.......... | 19.2 | 12.7 | 11.1 | 19.1 | 6.5 | 5.3 | 2.8 | 84 |
| Mental institutions... | | | | | | | | |
| Northeast.......... | 31.0 | 17.9 | 15.9 | 29.2 | 4.0 | 3.4 | 2.6 | 78 |
| Northeast.......... | 29.6 | 15.7 | 13.9 | 34.5 | 9.1 | 7.5 | 3.4 | 102 |
| Southeast.......... | 27.8 | 16.8 | 14.9 | 29.4 | 8.2 | 6.7 | 3.4 | 102 |
| Children's homes...... | | | | | | | | |
| Northeast.......... | 16.5 | 14.0 | 12.4 | 11.9 | 5.4 | 4.3 | 2.7 | 81 |
| Northeast.......... | 38.4 | 24.2 | 21.4 | 19.8 | 6.1 | 5.0 | 3.9 | 117 |
| Southeast.......... | 12.7 | 9.6 | 8.5 | 15.1 | 9.0 | 7.2 | 2.9 | 87 |
| Southeast.......... | 22.2 | 18.0 | 15.9 | 21.8 | 5.1 | 4.2 | 3.0 | 90 |
| Penal institutions.... | | | | | | | | |
| Northeast.......... | 34.4 | 23.6 | 20.9 | 34.5 | 10.2 | 8.3 | 4.6 | 138 |
| Northeast.......... | 44.9 | 24.0 | 21.4 | 42.8 | 10.7 | 8.8 | 4.5 | 135 |
| Southeast.......... | 34.1 | 20.3 | 18.0 | 29.4 | 4.8 | 4.0 | 3.1 | 93 |
| Southeast.......... | 48.2 | 34.6 | 30.7 | 24.0 | 7.0 | 5.8 | 5.1 | 153 |

For the most part, the dietitians in these hospitals were not interested in increasing the protein content of food supplies above the quantity being given at the time of the study. If an additional amount was needed in special cases, it was given under a doctor's prescription. Money allowances were not so low in these institutions as in some of the others studied.

The scope of this study was too limited to attempt any appraisal of the potentials of general hospitals as a market for oilseed proteins.

## EVALUATION OF THE CURRENT AND POTENTIAL INSTITUTIONAL MARKET

The current institutional market for soy products comprises a very small part of the total market. Other markets, such as animal feeds and industrial uses, are far more important.

At present, small quantities are included in the food supplies of some public mental institutions and homes for the aged. New York State, for example, allows a daily ration of 0.03 pound per person per day, which amounts to approximately 140,000 pounds per month. This is used in various kinds of breads, cakes, other sweet goods, and in several meat items. Current use by other institutions, however, does not approach this level.

To appraise institutions as a potential market for soybean flour, estimates were made of the quantity that would be used if the same amount of protein were provided and meat and cereal foods were supplemented to the 6-percent level. On this basis, the institutions studied could use from about 1,000 to 2,500 pounds of soy flour yearly for each 100 persons fed daily. This wide range is due to the different amounts of protein provided by the food used in the various institutions.

If, for example, only mental institutions and homes for the aged supplemented their diets with oilseed proteins to the extent of 0.03 pound per person per day (the amount currently used by New York State institutions), a market potential of 8 million pounds per year could be expected. This would be about an 11-percent increase over domestic consumption for 1954.

Were all types of institutions except general hospitals to use this level, a market potential of 77 million pounds a year might be realized, which would be about double the 1954 consumption. While this would represent a substantial increase, this market for oilseed meal still would be a secondary one. Marginal markets, however, are sometimes more important than their actual size indicates.

## DEVELOPING THE INSTITUTIONAL MARKET

Data from this study indicate that considerable preliminary work might be necessary to expand the institutional market for oilseed proteins. First, it appears that it would be necessary to develop methods by which oilseed proteins can be incorporated into many of the foods commonly served. It would be essential also to experiment with the quantities that can be incorporated with satisfactory results. In building such information, it might be highly desirable to have a technical representative work closely with the dietary staffs of several institutions.

Second, this study indicated a need for a strong merchandising program, as there appears to be a lack of interest on the part of administrators in such supplementation programs. A good case can be made for supplementation, for, as indicated previously, the use of the less expensive protein-seed meals should help "stretch" the food money allowance. This should be an important factor to administrators and, particularly, those operating on low budgets. Food expenditures usually represent the largest single recurring expenditure and, as such, are an important part of any institution's budget. To make the same amount of money do a better job of providing adequate meals is good management. Supplementation of foods with protein-seed meals should not reduce the nutritive value of the food and might actually increase it.

A third approach that might be used to reach this market would be to ascertain the kinds of partially prepared foods and mixes that are purchased. With the trend toward greater use of these products, it may be possible to incorporate larger quantities of protein meals in such foods.

A fourth factor of concern might be the development of distribution channels. On the basis of experience with two institutions, until the program gets well started, purchases of small quantities at a time can be expected. Unless manufacturers can service such small purchases through existing channels, a difficult problem may be presented.

Though this was a case study and hence limited in scope, it seems reasonable to conclude that the potential of the institutional market is not likely to be reached in the near future because of the requirements and problems involved.

## FOOD INDUSTRY USE OF SOY PROTEINS

In 1947, domestic use of soy flour and grits totaled approximately 60 million pounds per year. Of this, 40 percent went into pet foods and about an equal amount was used in cereal foods. Of the remainder, a little more than 10 percent was incorporated into meat items and another 10 percent was used in miscellaneous foods including candy.

By 1954, domestic consumption of soy flour and grits had risen to slightly more than 70 million pounds. This was largely due to the increased demand of pet food manufacturers, who took about half of the amount used in this country. At the same time, little change took place in quantities used by other food industries.

### Meat Products

Soy flour for use in meat products has gradually decreased in importance. Some is still being incorporated as a binder in sausages, frankfurters, and similar items, but less is being used in canned meats. Consumers are demanding more of the all-meat products and are willing to pay the added cost.

Recently soy flour has been gaining in importance as a breading agent for fresh and frozen meats and fish. If this demand continues, it may make this market a little more important.

### Pet Foods

Manufacturers of pet foods have become increasingly interested in soy products because of their high nutritional value in relation to cost. Some of these industries are incorporating up to 25 percent of soy products in pet foods. Such concentrations present much less of a flavor problem in these foods than in those produced for human consumption.

### Bakery Products

The use of soy flour in bakery products is not expected to increase considerably. This flour has been tried in breads, but has not been too popular. It produces a firmer type of bread, which some studies indicate consumers want, but actual sales data have not confirmed these stated preferences.

Sales for use in sweet rolls and coffee cake are not important and have shown little variation in the last 10 years. Because of soy flour's moisture-retention qualities, some bakers are still using it in dark cake formulas, particularly those with pronounced flavors.

A modified soy product has had some use as a dough conditioner. However, these sales are not expected to increase to any great extent, as this type of dough conditioner cannot be sterilized, and bacterial contamination has been a problem.

### Prepared Mixes

Soy flour is being incorporated into various types of mixes, particularly pancake, doughnut, cake, and pastry mixes. The proportions used have ranged from 3 to 10 percent, doughnut and pancake mixes having a higher percentage than the others. In doughnut mixes, soy flour offers the distinct advantages of preventing excessive fat absorption and slowing down the staling process.

In chiffon-type mixes, the whipping properties of soy protein isolates are utilized. The same properties are responsible also for the increased interest in these products on the part of manufacturers of confections and whipped toppings. Even so, the sales potential of this market is not expected to be very large.

## POTENTIAL MARKET IN FOOD INDUSTRY

Any expansion of the present industrial food market is likely to be very gradual. No new food uses for either soy or cottonseed flour are in prospect which would account for a substantial sales growth. The immediate problem is a need for developing among food manufacturers an awareness of the functional properties of oilseed flours. Further work on fractionation products of soy flour may develop new markets, but this also is likely to be gradual.

## APPENDIX A

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## APPENDIX B

Table 6.--Nutritive content of food issues: Average nutritive value of food issues per person per day during 28-day period, 16 selected institutions, summer, 1952

| Type of institution and location | Food energy | Protein | Calcium | Iron | Vitamin A value | Thiamine | Ribo-flavin | Niacin | Ascorbic acid |
|---|---|---|---|---|---|---|---|---|---|
| | Cal. | Gm. | Gm. | Mg. | I.U. | Mg. | Mg. | Mg. | Mg. |
| Homes for the aged.... | | | | | | | | | |
| Northeast.......... | 2,430 | 86 | 1.31 | 12.8 | 8,300 | 1.48 | 2.42 | 14.4 | 103 |
| Northeast.......... | 2,160 | 85 | 1.07 | 10.9 | 6,900 | 1.06 | 1.96 | 15.6 | 111 |
| Southeast.......... | 3,050 | 99 | 1.56 | 14.8 | 5,100 | 1.64 | 2.36 | 16.1 | 78 |
| Southeast.......... | 2,450 | 83 | 1.21 | 14.7 | 7,600 | 1.57 | 2.31 | 15.6 | 108 |
| Southeast.......... | 2,170 | 66 | 0.70 | 12.7 | 7,400 | 1.28 | 1.44 | 14.1 | 71 |
| Mental institutions... | | | | | | | | | |
| Northeast.......... | 2,970 | 100 | 1.07 | 14.6 | 6,800 | 1.50 | 2.15 | 15.6 | 93 |
| Northeast.......... | 3,160 | 106 | 1.13 | 23.5 | 7,000 | 2.11 | 2.23 | 21.5 | 128 |
| Southeast.......... | 3,130 | 90 | 1.04 | 17.3 | 11,700 | 2.03 | 2.27 | 19.2 | 134 |
| Children's homes...... | | | | | | | | | |
| Northeast.......... | 1,780 | 60 | .95 | 9.6 | 5,900 | 1.06 | 1.72 | 10.4 | 79 |
| Northeast.......... | 3,460 | 124 | 1.75 | 19.5 | 17,200 | 2.04 | 3.41 | 24.0 | 173 |
| Southeast.......... | 2,160 | 78 | 1.37 | 12.4 | 8,700 | 1.40 | 2.43 | 13.3 | 136 |
| Southeast.......... | 3,140 | 101 | 1.58 | 13.5 | 5,100 | 1.97 | 2.78 | 16.3 | 94 |
| Penal institutions.... | | | | | | | | | |
| Northeast.......... | 4,910 | 157 | 2.44 | 26.1 | 17,600 | 2.85 | 4.47 | 28.6 | 260 |
| Northeast.......... | 5,360 | 164 | 2.22 | 28.3 | 12,600 | 2.60 | 4.14 | 28.4 | 173 |
| Southeast.......... | 3,850 | 136 | 1.90 | 26.9 | 23,700 | 2.74 | 3.97 | 25.5 | 232 |
| Southeast.......... | 3,710 | 116 | 1.49 | 19.8 | 10,500 | 2.14 | 2.60 | 27.7 | 116 |

Table 7.--Nutritive content of food issues: Average nutritive value of food issues per person per day, during 28-day period, 16 selected institutions, winter, 1952

| Type of institution and location | Food energy | Protein | Calcium | Iron | Vitamin A value | Thiamine | Ribo-flavin | Niacin | Ascorbic acid |
|---|---|---|---|---|---|---|---|---|---|
| | Cal. | Gm. | Gm. | Mg. | I.U. | Mg. | Mg. | Mg. | Mg. |
| Homes for the aged.... | | | | | | | | | |
| Northeast.......... | 2,620 | 91 | 1.38 | 15.9 | 7,900 | 1.80 | 2.45 | 16.2 | 139 |
| Northeast.......... | 2,060 | 78 | 0.74 | 11.1 | 6,400 | 0.98 | 1.51 | 15.0 | 108 |
| Southeast.......... | 3,220 | 104 | 1.60 | 20.6 | 12,500 | 2.35 | 2.89 | 22.4 | 169 |
| Southeast.......... | 2,520 | 80 | 1.17 | 14.3 | 9,800 | 1.72 | 2.28 | 15.0 | 118 |
| Southeast.......... | 2,170 | 68 | .86 | 13.4 | 11,600 | 1.34 | 1.62 | 14.0 | 92 |
| Mental institutions... | | | | | | | | | |
| Northeast.......... | 3,180 | 104 | 1.33 | 16.6 | 13,600 | 2.02 | 2.51 | 16.6 | 154 |
| Northeast.......... | 3,260 | 110 | 1.20 | 23.1 | 13,100 | 2.48 | 2.57 | 22.9 | 178 |
| Southeast.......... | 2,740 | 82 | .88 | 15.6 | 7,700 | 2.00 | 1.82 | 17.5 | 189 |
| Children's homes...... | | | | | | | | | |
| Northeast.......... | 2,030 | 71 | .97 | 12.7 | 8,700 | 1.29 | 2.02 | 15.2 | 94 |
| Northeast.......... | 3,760 | 139 | 1.86 | 22.2 | 14,500 | 2.31 | 3.59 | 25.9 | 169 |
| Southeast.......... | 2,090 | 74 | 1.21 | 11.4 | 9,500 | 1.29 | 2.49 | 11.1 | 119 |
| Southeast.......... | 3,200 | 103 | 1.70 | 14.1 | 6,900 | 1.82 | 2.88 | 16.2 | 89 |
| Penal institutions.... | | | | | | | | | |
| Northeast.......... | 4,750 | 156 | 2.12 | 28.6 | 15,400 | 3.24 | 4.00 | 29.4 | 250 |
| Northeast.......... | 5,070 | 152 | 1.85 | 28.3 | 22,600 | 2.61 | 3.80 | 28.7 | 156 |
| Southeast.......... | 4,130 | 146 | 1.98 | 26.9 | 13,500 | 3.08 | 4.06 | 28.3 | 210 |
| Southeast.......... | 3,110 | 104 | 1.18 | 18.4 | 10,100 | 1.65 | 2.62 | 20.8 | 120 |

Table 8.--Nutritive content of food eaten: Average nutritive value of food eaten per person per day corrected for food losses and cooking losses, during 28-day period, 16 selected institutions, summer, 1952

| Type of institution and location | Food energy | Protein | Calcium | Iron | Vitamin A value | Thiamine | Riboflavin | Niacin | Ascorbic acid |
|---|---|---|---|---|---|---|---|---|---|
| | Cal. | Gm. | Gm. | Mg. | I.U. | Mg. | Mg. | Mg. | Mg. |
| Homes for the aged | | | | | | | | | |
| Northeast | 1,910 | 65 | 1.12 | 9.0 | 6,300 | 0.98 | 1.94 | 8.8 | 64 |
| Northeast | 1,850 | 71 | 0.97 | 8.7 | 5,500 | .78 | 1.67 | 11.1 | 71 |
| Southeast | 2,610 | 83 | 1.41 | 11.8 | 4,100 | 1.21 | 2.00 | 11.5 | 47 |
| Southeast | 1,700 | 57 | .97 | 9.3 | 5,000 | .90 | 1.66 | 8.9 | 56 |
| Southeast | 1,860 | 55 | .63 | 10.1 | 6,000 | .91 | 1.17 | 10.0 | 36 |
| Mental institutions | | | | | | | | | |
| Northeast | 2,540 | 84 | .97 | 11.6 | 5,400 | 1.12 | 1.83 | 11.2 | 55 |
| Northeast | 2,700 | 89 | 1.02 | 18.7 | 5,600 | 1.53 | 1.88 | 15.3 | 87 |
| Southeast | 2,460 | 68 | .89 | 12.2 | 8,800 | 1.29 | 1.72 | 11.7 | 60 |
| Children's homes | | | | | | | | | |
| Northeast | 1,690 | 56 | .92 | 8.7 | 5,400 | .81 | 1.55 | 8.0 | 55 |
| Northeast | 2,790 | 98 | 1.52 | 14.2 | 11,100 | 1.34 | 2.75 | 15.5 | 93 |
| Southeast | 2,050 | 73 | 1.32 | 11.2 | 8,000 | 1.16 | 2.24 | 11.0 | 106 |
| Southeast | 2,980 | 95 | 1.52 | 12.2 | 4,700 | 1.57 | 2.58 | 13.3 | 69 |
| Penal Institutions | | | | | | | | | |
| Northeast | 3,960 | 124 | 2.12 | 19.0 | 11,400 | 1.85 | 3.61 | 18.2 | 133 |
| Northeast | 4,090 | 122 | 1.87 | 19.5 | 8,600 | 1.64 | 3.22 | 17.5 | 92 |
| Southeast | 3,110 | 107 | 1.65 | 19.6 | 15,300 | 1.79 | 3.21 | 16.0 | 119 |
| Southeast | 3,520 | 109 | 1.44 | 17.9 | 9,600 | 1.79 | 2.36 | 22.5 | 74 |

Table 9.--Nutritive content of food eaten: Average nutritive value of food eaten per person per day corrected for food losses and cooking losses, during 28-day period, 16 selected institutions, winter, 1952

| Type of institution and location | Food energy | Protein | Calcium | Iron | Vitamin A value | Thiamine | Riboflavin | Niacin | Ascorbic acid |
|---|---|---|---|---|---|---|---|---|---|
| | Cal. | Gm. | Gm. | Mg. | I.U. | Mg. | Mg. | Mg. | Mg. |
| Homes for the aged | | | | | | | | | |
| Northeast | 2,060 | 68 | 1.18 | 11.2 | 6,000 | 1.19 | 1.98 | 9.8 | 89 |
| Northeast | 1,760 | 65 | 0.67 | 8.8 | 5,100 | 0.70 | 1.28 | 10.7 | 75 |
| Southeast | 2,760 | 87 | 1.44 | 16.4 | 10,100 | 1.68 | 2.39 | 15.8 | 78 |
| Southeast | 1,750 | 55 | .94 | 9.0 | 6,400 | 1.01 | 1.64 | 8.4 | 64 |
| Southeast | 1,860 | 57 | .78 | 10.7 | 9,300 | .96 | 1.35 | 9.9 | 60 |
| Mental institutions | | | | | | | | | |
| Northeast | 2,720 | 87 | 1.20 | 13.2 | 10,900 | 1.46 | 2.14 | 12.2 | 104 |
| Northeast | 2,790 | 92 | 1.08 | 18.4 | 10,500 | 1.77 | 2.13 | 16.2 | 120 |
| Southeast | 2,160 | 62 | .75 | 11.0 | 5,800 | 1.31 | 1.41 | 10.6 | 106 |
| Children's homes | | | | | | | | | |
| Northeast | 1,920 | 67 | .93 | 11.5 | 8,000 | 1.07 | 1.87 | 12.9 | 70 |
| Northeast | 3,040 | 109 | 1.61 | 16.2 | 9,400 | 1.51 | 2.92 | 16.9 | 93 |
| Southeast | 1,980 | 69 | 1.17 | 10.3 | 8,700 | 1.05 | 2.28 | 9.1 | 89 |
| Southeast | 3,030 | 97 | 1.64 | 12.7 | 6,300 | 1.47 | 2.68 | 13.4 | 66 |
| Penal institutions | | | | | | | | | |
| Northeast | 3,830 | 123 | 1.84 | 20.8 | 19,000 | 2.13 | 3.24 | 19.9 | 137 |
| Northeast | 3,870 | 113 | 1.56 | 19.5 | 15,500 | 1.65 | 2.95 | 18.4 | 91 |
| Southeast | 3,330 | 115 | 1.72 | 19.6 | 8,700 | 2.07 | 3.33 | 18.4 | 119 |
| Southeast | 2,950 | 97 | 1.14 | 16.6 | 9,300 | 1.29 | 2.40 | 17.0 | 91 |

Table 10.--Average money value and percentage distribution of food groups as issued per person per day, during 28-day period, 16 selected institutions, summer, 1952

| Food group | Type and location of institution | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Homes for the aged | | | | | Mental | | | Children's home | | | | Penal | | | |
| | North-east | North-east 1/ | South-east | South-east | South-east | North-east | North-east | South-east | North-east | North-east | South-east | South-east | North-east | North-east | South-east | South east |
| | Average money value per person per day (dollars) | | | | | | | | | | | | | | | |
| Total money value | 0.536 | 0.837 | 0.608 | 0.675 | 0.478 | 0.481 | 0.644 | 0.559 | 0.561 | 0.846 | 0.598 | 0.666 | 1.044 | 1.013 | 0.754 | 0.902 |
| Leafy, green, and yellow vegetables | .018 | .029 | .035 | .068 | .029 | .019 | .025 | .024 | .025 | .036 | .025 | .023 | .061 | .056 | .068 | .046 |
| Citrus fruit, tomatoes | .023 | .030 | .019 | .027 | .018 | .012 | .023 | .008 | .022 | .028 | .032 | .021 | .033 | .033 | .030 | .023 |
| Potatoes, sweet potatoes | .021 | .015 | .010 | .008 | .003 | .013 | .032 | .014 | .014 | .039 | .014 | .017 | .073 | .024 | .020 | .021 |
| Other vegetables and fruits | .046 | .057 | .034 | .059 | .032 | .029 | .073 | .057 | .061 | .075 | .045 | .031 | .101 | .094 | .052 | .105 |
| Milk, cream, ice cream, and cheese | .160 | .146 | .160 | .165 | .072 | .090 | .083 | .081 | .137 | .239 | .195 | .183 | .294 | .197 | .220 | .134 |
| Meat, poultry, fish | .135 | .318 | .135 | .130 | .127 | .179 | .157 | .168 | .140 | .242 | .096 | .180 | .236 | .240 | .203 | .346 |
| Eggs | .026 | .060 | .037 | .053 | .054 | .031 | .040 | .042 | .034 | .043 | .042 | .029 | .055 | .052 | .031 | .040 |
| Dry beans and peas, nuts | .004 | .003 | .008 | .006 | .004 | .010 | .033 | 0 | .005 | .012 | .010 | .010 | .009 | .014 | .012 | .005 |
| Flour, cereals, baked goods | .057 | .086 | .053 | .073 | .065 | .040 | .091 | .082 | .054 | .061 | .090 | .051 | .102 | .107 | .048 | .070 |
| Fats and oils | .010 | .035 | .062 | .035 | .036 | .023 | .029 | .023 | .022 | .027 | .021 | .072 | .043 | .048 | .038 | .056 |
| Sugars, sweets | .018 | .023 | .031 | .022 | .019 | .022 | .016 | .040 | .032 | .027 | .019 | .035 | .029 | .040 | .024 | .039 |
| Miscellaneous | .018 | .035 | .024 | .029 | .019 | .013 | .042 | .020 | .015 | .017 | .009 | .014 | .008 | .108 | .008 | .017 |
| | Distribution of money value per person per day (percent) | | | | | | | | | | | | | | | |
| Total money value | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Leafy, green, and yellow vegetables | 3.4 | 3.5 | 5.8 | 10.1 | 6.1 | 4.0 | 3.9 | 4.3 | 4.5 | 4.3 | 4.2 | 3.5 | 5.8 | 5.5 | 9.0 | 5.1 |
| Citrus fruit, tomatoes | 4.3 | 3.6 | 3.1 | 4.0 | 3.8 | 2.5 | 3.6 | 1.4 | 3.9 | 3.3 | 5.4 | 3.2 | 3.2 | 3.3 | 4.0 | 2.5 |
| Potatoes, sweet potatoes | 3.9 | 1.8 | 1.6 | 1.2 | 0.6 | 2.7 | 5.0 | 2.5 | 2.5 | 4.6 | 2.3 | 2.6 | 7.0 | 2.4 | 2.7 | 2.3 |
| Other vegetables and fruits | 8.6 | 6.8 | 5.6 | 8.7 | 6.7 | 6.0 | 11.3 | 10.2 | 10.9 | 8.9 | 7.5 | 4.7 | 9.7 | 9.3 | 6.9 | 11.6 |
| Milk, cream, ice cream, and cheese | 29.8 | 17.4 | 26.4 | 24.3 | 15.1 | 18.7 | 12.9 | 14.5 | 24.4 | 28.3 | 32.5 | 27.4 | 28.1 | 19.4 | 29.1 | 14.9 |
| Meat, poultry, fish | 25.1 | 37.9 | 22.2 | 19.3 | 26.5 | 37.2 | 24.4 | 30.0 | 24.9 | 28.5 | 16.1 | 26.9 | 22.5 | 23.7 | 26.9 | 38.4 |
| Eggs | 4.9 | 7.2 | 6.1 | 7.9 | 11.3 | 6.4 | 6.2 | 7.5 | 6.1 | 5.1 | 7.0 | 4.4 | 5.3 | 5.1 | 4.1 | 4.4 |
| Dry beans and peas, nuts | 0.7 | 0.4 | 1.3 | 0.9 | .8 | 2.1 | 5.1 | 0 | 0.9 | 1.4 | 1.7 | 1.5 | 0.9 | 1.4 | 1.6 | 0.6 |
| Flour, cereals, baked goods | 10.6 | 10.3 | 8.7 | 10.8 | 13.6 | 8.3 | 14.1 | 14.7 | 9.6 | 7.2 | 15.1 | 7.7 | 9.8 | 10.6 | 6.4 | 7.8 |
| Fats and oils | 1.9 | 4.2 | 10.2 | 5.2 | 7.5 | 4.8 | 4.5 | 4.1 | 3.9 | 3.2 | 3.5 | 10.7 | 4.1 | 4.7 | 5.0 | 6.2 |
| Sugars, sweets | 3.4 | 2.7 | 5.1 | 3.3 | 4.0 | 4.6 | 2.5 | 7.2 | 5.7 | 3.2 | 3.2 | 5.3 | 2.8 | 3.9 | 3.2 | 4.3 |
| Miscellaneous | 3.4 | 4.2 | 3.9 | 4.3 | 4.0 | 2.7 | 6.5 | 3.6 | 2.7 | 2.0 | 1.5 | 2.1 | .8 | 10.7 | 1.1 | 1.9 |

1/ Data for this institution cover only a 2-week period.

Table 11.--Average money value and percentage distribution of food groups as issued per person per day, during 28-day period, 16 selected institutions, winter, 1952

| Food group | Type and location of institution | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Homes for the aged | | | | | Mental | | | Children's home | | | | Penal | | | |
| | North-east | North-east | South-east | South-east | South-east | North-east | North-east | South-east | North-east | North-east | South-east | South-east | North-east | North-east | South-east | South east |
| | Average money value per person per day (dollars) | | | | | | | | | | | | | | | |
| Total money value | 0.530 | 0.748 | 0.647 | 0.607 | 0.438 | 0.588 | 0.660 | 0.525 | 0.656 | 0.924 | 0.552 | 0.691 | 0.944 | 0.983 | 0.764 | 0.786 |
| Leafy, green, and yellow vegetables | .017 | .026 | .031 | .033 | .020 | .026 | .048 | .026 | .033 | .032 | .019 | .016 | .034 | .047 | .040 | .032 |
| Citrus fruit, tomatoes | .025 | .027 | .016 | .022 | .011 | .020 | .030 | .016 | .035 | .032 | .028 | .014 | .036 | .038 | .038 | .034 |
| Potatoes, sweet potatoes | .028 | .018 | .008 | .017 | .005 | .014 | .022 | .011 | .017 | .028 | .007 | .015 | .057 | .025 | .020 | .012 |
| Other vegetables and fruits | .035 | .047 | .047 | .065 | .043 | .045 | .041 | .037 | .068 | .059 | .035 | .042 | .065 | .040 | .064 | .099 |
| Milk, cream, ice cream, and cheese | .170 | .096 | .169 | .156 | .079 | .141 | .107 | .052 | .133 | .249 | .170 | .220 | .239 | .177 | .187 | .118 |
| Meat, poultry, fish | .123 | .313 | .205 | .117 | .123 | .211 | .192 | .161 | .205 | .321 | .070 | .169 | .251 | .276 | .252 | .288 |
| Eggs | .015 | .037 | .020 | .039 | .041 | .028 | .032 | .039 | .034 | .046 | .083 | .050 | .059 | .056 | .017 | .036 |
| Dry beans and peas, nuts | .005 | .007 | .012 | .007 | .006 | .009 | .009 | .002 | .007 | .013 | .003 | .029 | .014 | .013 | .012 | .013 |
| Flour, cereals, baked goods | .065 | .091 | .068 | .067 | .060 | .039 | .091 | .098 | .054 | .062 | .077 | .037 | .101 | .114 | .061 | .033 |
| Fats and oils | .010 | .038 | .021 | .038 | .022 | .019 | .030 | .022 | .022 | .039 | .021 | .026 | .042 | .047 | .027 | .057 |
| Sugars, sweets | .016 | .016 | .024 | .019 | .011 | .020 | .016 | .025 | .019 | .028 | .027 | .045 | .030 | .043 | .038 | .022 |
| Miscellaneous | .021 | .032 | .026 | .027 | .017 | .016 | .042 | .036 | .029 | .015 | .012 | .028 | .016 | .107 | .008 | .042 |
| | Distribution of money value per person per day (percent) | | | | | | | | | | | | | | | |
| Total money value | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Leafy, green, and yellow vegetables | 3.2 | 3.5 | 4.8 | 5.4 | 4.6 | 4.4 | 7.3 | 5.0 | 5.0 | 3.5 | 3.4 | 2.3 | 3.6 | 4.8 | 5.2 | 4.1 |
| Citrus fruit, tomatoes | 4.7 | 3.6 | 2.5 | 3.6 | 2.5 | 3.4 | 4.5 | 3.0 | 5.3 | 3.5 | 5.1 | 2.0 | 3.8 | 3.9 | 5.0 | 4.3 |
| Potatoes, sweet potatoes | 5.3 | 2.4 | 1.2 | 2.8 | 1.1 | 2.4 | 3.3 | 2.1 | 2.6 | 3.0 | 1.3 | 2.2 | 6.0 | 2.5 | 2.6 | 1.5 |
| Other vegetables and fruits | 6.6 | 6.3 | 7.3 | 10.7 | 9.8 | 7.7 | 6.2 | 7.0 | 10.4 | 6.4 | 6.3 | 6.1 | 6.9 | 4.1 | 8.4 | 12.6 |
| Milk, cream, ice cream, and cheese | 32.1 | 12.8 | 26.1 | 25.8 | 18.0 | 24.0 | 16.2 | 9.9 | 20.3 | 26.9 | 30.9 | 31.7 | 25.3 | 18.0 | 24.5 | 15.0 |
| Meat, poultry, fish | 23.2 | 41.9 | 31.7 | 19.3 | 28.1 | 35.9 | 29.2 | 30.6 | 31.2 | 34.8 | 12.7 | 24.5 | 26.6 | 28.0 | 33.0 | 36.6 |
| Eggs | 2.8 | 4.9 | 3.1 | 6.4 | 9.4 | 4.8 | 4.8 | 7.4 | 5.2 | 5.0 | 15.0 | 7.2 | 6.3 | 5.7 | 2.2 | 4.6 |
| Dry beans and peas, nuts | 0.9 | 0.9 | 1.9 | 1.2 | 1.4 | 1.5 | 1.4 | 0.4 | 1.1 | 1.4 | 0.5 | 4.2 | 1.5 | 1.3 | 1.6 | 1.7 |
| Flour, cereals, baked goods | 12.3 | 12.2 | 10.5 | 11.0 | 13.7 | 6.6 | 13.8 | 18.7 | 8.2 | 6.7 | 13.9 | 5.4 | 10.7 | 11.6 | 8.0 | 4.2 |
| Fats and oils | 1.9 | 5.1 | 3.2 | 6.3 | 5.0 | 3.2 | 4.5 | 4.2 | 3.4 | 4.2 | 3.8 | 3.8 | 4.4 | 4.8 | 3.5 | 7.3 |
| Sugars, sweets | 3.0 | 2.1 | 3.7 | 3.1 | 2.5 | 3.4 | 2.4 | 4.8 | 2.9 | 3.0 | 4.9 | 6.5 | 3.2 | 4.4 | 5.0 | 2.8 |
| Miscellaneous | 4.0 | 4.3 | 4.0 | 4.4 | 3.9 | 2.7 | 6.4 | 6.9 | 4.4 | 1.6 | 2.2 | 4.1 | 1.7 | 10.9 | 1.0 | 5.3 |

Table 12.--Average money value of food as issued per person per day, by source, during 28-day period, 16 selected institutions, summer, 1952

| Source | Type and location of institution | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Homes for the aged | | | | | Mental | | |
| | North-east | North-east | South-east | South-east | South-east | North-east | North-east | South-east |
| | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars |
| Bought | 0.379 | 0.837 | 0.414 | 0.647 | 0.431 | 0.366 | 0.463 | 0.279 |
| Institution-produced | .103 | 0 | .138 | 0 | 0 | .094 | .061 | .129 |
| Other 1/ | 2/ | .019 | .027 | .028 | .047 | .018 | .006 | .044 |
| Processed from bought | .046 | 0 | 0 | 0 | 0 | 0 | .112 | .091 |
| Processed from institution-produced | .008 | 0 | .029 | 0 | 0 | .003 | .002 | .016 |
| Processed from other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| All food | 0.536 | 0.856 | 0.608 | 0.675 | 0.478 | 0.481 | 0.644 | 0.559 |

| Source | Type and location of institution | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Children's home | | | | Penal | | | |
| | North-east | North-east | South-east | South-east | North-east | North-east | South-east | South-east |
| | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars |
| Bought | 0.534 | 0.744 | 0.512 | 0.069 | 0.596 | 0.735 | 0.441 | 0.866 |
| Institution-produced | 0 | .037 | 0 | .367 | .344 | .188 | .258 | .006 |
| Other 1/ | .027 | 2/ | .085 | .082 | .020 | 0 | .014 | .030 |
| Processed from bought | 0 | .051 | .001 | 0 | .069 | .070 | 0 | 0 |
| Processed from institution-produced | 0 | .014 | 0 | .148 | .015 | .020 | .041 | 0 |
| Processed from other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| All food | 0.561 | 0.846 | 0.598 | 0.666 | 1.044 | 1.013 | 0.754 | 0.902 |

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1/ Other--donated and government issue.

2/ 0.0005 dollar or less.

Table 13.--Average money value of food as issued per person per day, by source, during 28-day period, 16 selected institutions, winter, 1952

| Source | Type and location of institution | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Homes for the aged | | | | | Mental | | |
| | North-east | North-east | South-east | South-east | South-east | North-east | North-east | South-east |
| | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars |
| Bought | 0.400 | 0.743 | 0.413 | 0.582 | 0.407 | 0.393 | 0.480 | 0.274 |
| Institution-produced | .067 | 0 | 0 | 0 | 0 | .118 | .067 | .084 |
| Other 1/ | .006 | .015 | .234 | .025 | .031 | .070 | .008 | .034 |
| Processed from bought | .047 | 0 | 0 | 0 | 0 | 0 | .079 | .102 |
| Processed from institution-produced | .010 | 0 | 0 | 0 | 0 | .007 | .026 | .027 |
| Processed from other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .004 |
| All food | 0.530 | 0.758 | 0.647 | 0.607 | 0.438 | 0.588 | 0.660 | 0.525 |

| Source | Type and location of institution | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Children's home | | | | Penal | | | |
| | North-east | North-east | South-east | South-east | North-east | North-east | South-east | South-east |
| | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars |
| Bought | 0.647 | 0.874 | 0.413 | 0.117 | 0.573 | 0.657 | 0.520 | 0.756 |
| Institution-produced | 0 | 0 | 0 | .394 | .262 | .154 | .164 | .011 |
| Other 1/ | .009 | 0 | .139 | .128 | .019 | 0 | .047 | .019 |
| Processed from bought | 0 | .037 | 0 | 0 | .067 | .105 | 0 | 0 |
| Processed from institution-produced | 0 | .013 | 0 | .052 | .023 | .067 | .033 | 0 |
| Processed from other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| All food | 0.656 | 0.924 | 0.552 | 0.691 | 0.944 | 0.983 | 0.764 | 0.786 |

1/ Other--donated and government issue.

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